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Biotechnology

India Enters the GMO Era

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Report Highlights:

With the approval of Bt cottonseed, India has entered the GMO era. Skepticism over ag biotechnology continues however, with attempts by some environmentalists to overturn the government's decision on cotton, and efforts by the Agriculture Minister to ban the import of soybean oil.

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Debate Over Bt Cotton Culminates in Approval...

The Indian government's recent approval of three Bt cotton varieties for commercial use has boosted the morale of India's cotton growers and the country's scientific community. However, a rear-guard action is still being fought by some environmental groups who maintain that sufficient testing has not occurred, and that adequate bio-safeguards are not in place. Approval was granted by the Genetic Engineering Approval Committee (GEAC) for cultivation of Bt varieties in southern/western producing areas for a three-year period beginning April 2002 (see appendix for conditions). A Bt variety adapted to the northern region was denied clearance because of inadequate test data.

Besides the compelling scientific evidence, approval of Bt seed may well have been influenced by last season's unusually heavy infestation of boll worms (some fields were sprayed up to 25 times) and by a series of incidents surrounding the planting of an unapproved Bt variety in the major cotton producing state of Gujarat. This seed, distributed by a small, local seed company (Navbharat), and grown on an estimated 10,000 acres, provided farmers with dramatic evidence of Bt cotton's efficacy, and resulted in a run on Bt seed as farmers began buying the seed cotton from their neighbors at up to 15 times the market price. With farmers clamoring for the new insect resistant seed, the government unable to buy, segregate and destroy the illicit production, and the Agriculture Minister strongly endorsing the Bt technology, approval finally came.

...After a Six-Year Wait

Maharashtra Hybrid Seed Company (MAHYCO), Monsanto's joint-venture partner, had been involved in the testing of Bt cotton per GEAC's protocol since 1996, and on June 19, 2001, was expecting to receive approval for commercial sales. However, divisions in the GEAC led to a decision to postpone the release of Bt varieties pending another year of trials. As this decision was made at a time when the sowing of the northern crop had been all but completed, it was impossible to carry out GEAC-mandated trials in the north for the 2001 season. Thus, the Bt variety for this region is yet to be approved.

Northern cotton growers are said to be very unhappy with having to wait another year for relief from boll worms, and it appears that some traders have started cheating farmers by selling them bogus seed. Other farmers are visiting bordering states to buy the Bt varieties approved for those areas. Meanwhile, Agriculture Minister Ajit Singh has indicated that the Indian Council of Agricultural Research (ICAR) is doing trials on Bt varieties suitable for the north and that the results would be known "soon." He's also reported as saying that India is likely to develop its own transgenic cotton within three years.

While Farmers Greet Approval, Some Environmentalists Worry...

Farmers and farm leaders have welcomed the release of Bt cotton seed, noting that it gives India (with its large seeded area but abysmal yields) the opportunity to become the world's leading cotton producer. It now ranks third behind China and the United States. Several media pieces congratulated the government on its decision, and speculated that biotechnology would dwarf the

achievements of the first "green revolution" which, since the late 60's had dramatically changed the lives of wheat farmers in northern India by increasing wheat's productivity several-fold.

Perhaps the most controversial aspect of the Bt technology is the required "refuge belt," the specified planting of 20 percent of the seeded area to non-Bt varieties in order to reduce the chances of insects developing resistance to the Bt gene. It will be very difficult to enforce in India given the prevalence of small/marginal farms and the extent of land fragmentation.

The "refuge belt" has also been described by some environmentalists as an "anti-small farmer" policy, and the forerunner of coming attempts by multi-nationals and other commercial interests to take over the country's agriculture. They also claim that the conditional release of Bt cotton contravenes GEAC'S mandate to ensure bio-safety as, they say, the agency does not have a plan for the effective monitoring of conditions associated with the release of Bt seed. Some environmentalists also claim that Bt cotton was developed for tropical climates under which few cotton pests exist (sic) and in the subtropical conditions of India it will make the crop more vulnerable to other cotton pests and might even boost the needed level of pesticide use. The anti-GMO movement also has alleged that the effect of the Bt varieties on the environment and human health are yet to be verified.

Joining the environmentalists, a group of anti-MNC (multi-national corporation) farmers have claimed that the government has overstated the benefits of Bt cotton which, they warn, will lead to MNC dominance of the country. They have warned that they will destroy the fields of any farmers who use the Bt seed.

...And Scientists Move Ahead on Other Biotech Crops

Right on the heels of the Bt cotton release, ICAR sources note that Indian scientists are working on genetically modified strains of rice, mustard, tomato, potato, and other crops that would have higher productivity and reduce the use of pesticides and water. ICAR also claims that scientists are working on a "recyclable" variety of Bt cotton which would enable farmers to increase their productivity with seed saved from their own crop.

Encouraged by the release of Bt cotton, PGS Aventis (Belgium), represented by Proagro PGS India Limited, has announced its intention to release a GM mustard variety incorporating a gene which will enable hybridization to increase the productivity of that crop by about 30 percent. Amareswara Agri-Tech Ltd, a seed company based in south India, has said that it plans to introduce a range of Bt cotton hybrid varieties. The company currently is working on transfer of herbicide resistance into popular rice varieties to effectively check productivity decline due to weed infestation. A private seeds manufacturer, Naath Seeds, has recently been approved by the government to work on a Bt cotton project based on "Fusion Gene" technology, considered to be an improvement over the Bt technology used by MAHYCO. The fact that the technology for the fusion gene has been acquired from the Chinese "Biocentury Transgene" shows that the Indian biotech R&D community is closely monitoring Chinese developments.

Cotton Approval Opens Up Debate on Labeling...

The approval for MAHYCO's Bt cotton has rekindled the debate on whether to label products derived from genetically modified crops. While technical staff have so far not taken it up at GEAC meetings, there is a strong view that cottonseed oil and other food products should be labeled. However, views on labeling still have not come to terms with the feasibility of identity preservation, traceability and even the technology for testing whether a product is derived from genetically modified plants.

...While Ag Minister Seeks to Block Soybean Imports

Although the Agriculture Minister has arguing strongly that Indian cotton farmers should not be denied access to the fruits of biotechnology, he has a much different view on consumer access to GM soybean oil, which he has been attempting to ban. This coincides curiously with demands from the Soybean Oil Processors Association (SOPA) and Central Organization for Oil Industry and Trade (COOIT) to halt imports of soybean oil, and suggests that this matter may have more to do with trade concerns than with food safety. The issue, it seems, is how to bar the import of soybean oil (which enjoys a bound duty of 45 pct) without violating WTO principles. The Indian Vegetable Oil Processors Association has called the Minister's position "neither technically feasible, nor legally sustainable, nor commercially desirable."

According to recent press reports, the Minister has now backed off of his attempt to ban soybean imports (which appears to be beyond his authority) and favors a plan under which importers would have to declare whether their product is of GMO origin. As the Minister acknowledges that the government lacks the means to distinguish GM oil from non-GM oil (at least for the refined product), the effectiveness of the proposed declaration would appear to depend heavily upon the honesty of the importers.

Appendix 1. Bt Cotton: Approval Terms & Conditions

The use of the (3) Bt cotton varieties developed by Mahyco/Monsanto comes with the following guidelines:

- 1) Every field should contain a "refuge belt" of 20 percent non-GM cotton surrounding the GM cotton. Each packet of seeds of the approved Bt cotton varieties should also contain a packet of seeds of the same non-GM variety meant for sowing in the "refuge belt."
- 2) Each seed packet sold should be appropriately labeled, indicating contents and description of the Bt hybrid, including the name of the transgenes, GEAC approval reference, and genetic and physical purity of the seeds. The packet should also contain detailed directions for use including sowing pattern, pest management, suitability of agro-climatic conditions, etc., in the vernacular language.
- 3) The company should prepare annual reports by 31st March each year on the use of Bt cotton hybrid varieties by dealer, acreage, and locality (state/region) and submit the same in electronic form to GEAC if requested.
- 4) The company will develop plans for Bt cotton-based integrated pest management for inclusion in the seed packet.
- 5) The company must monitor annually the susceptibility of boll worms to the Bt gene vis-a-vis baseline susceptibility data, and submit data relating to resistance development, if any, to GEAC. Another agency to be identified by the Ministry of Environment & Forests will also monitor the same at the applicant's cost.
- 6) The company should undertake appropriate awareness and education program with the aid of suitable educational materials to the farmers, dealers and others.
- 7) The company should also undertake studies on the possible impacts of the Bt cotton gene on non-target insects and crops and report back to GEAC annually.
- 8) Apart from developing and depositing the DNA finger prints of the approved varieties, the company should also deposit 100 grams of seed of each of the approved hybrids, as well as their parental lines, with the National Bureau of Plant Genetic Resources (NBPGR). The company should also provide NBPGR with the testing procedures for identifying transgenic traits in the approved varieties by DNA and protein methods.

The Ministry of Environment and Forests, while reserving its right to stipulate additional conditions, may revoke the clearance if the company does not implement the above stipulations satisfactorily.

Appendix 2. Rules Governing the Import of GM Food Stuffs

From the December 5, 1989 Notification of the Ministry of Environment and Forests**11. Permission and approval for food stuffs**

Food stuffs, ingredients in food stuffs and additives including processing and containing or consisting of genetically engineered organisms or cells, shall not be produced, sold, imported or used except with the approval of the Genetic Engineering Approval Committee.

12. Guidelines

(1) Any person who applies for approval under rules 8-11 shall, as determined by the Genetic Engineering Approval Committee, submit information and make examinations or cause examinations to be made to eradicate the case, including examinations according to specific directions and at specific laboratories. He shall also make available an on-site emergency plan to GEAC before obtaining the approval. If the authority makes examination itself, it may order the applicant to delay the expenses incurred by it in so doing.

(2) Any person to whom an approval has been granted under rules 8-11 above shall notify the Genetic Engineering Approval Committee of any change in or addition to the information already submitted

13. Grant of approval

(1) In connection with the granting of approval under rules 8 to 11 above, terms and conditions shall be stipulated, including terms and conditions as to the control to be exercised by the applicant, supervision, restriction on use, the layout of the enterprise and as to the submission of information to the State Biotechnology Co-ordination Committee or to the District Level Committee.

(2) All approvals of the Genetic Engineering Approval Committee shall be for a specific period not exceeding 4 years at the first instance and renewable for 2 years at a time. The Genetic Engineering Approval Committee shall have powers to revoke such approval in the following situations:

- (a) If there is any new information as to the harmful effects of the genetically engineered organisms or cells.
- (b) If the genetically engineered organisms or cells cause such damage to the environment, nature or health as could not be envisaged when the approval was given, or
- (c) Non compliance of any condition stipulated by the Genetic Engineering Approval Committee.